CLAIMS

WHAT IS CLAIMED IS:

1. A system for imaging an airfoil within a combustion turbine engine comprising:

an image receptor;

a radial positioner extending through an opening in an inner turbine casing of the engine and disposing the image receptor within the casing at a first position for acquiring a first image and at a second position for acquiring a second image;

a storage device storing the first and second images; and

a processor accessing the storage device to generate a composite image from the first and second images.

2. The system of claim 1, wherein the radial positioner further comprises a drive mechanism for rotating the radial positioner about a radial axis.

3. The system of claim 1, further comprising a sensor generating a position signal responsive to a radial position of the image receptor within the turbine casing.

4. The system of claim 1, further comprising:

a sensor generating a position signal responsive to a detected angular position of the airfoil as the airfoil rotates about a shaft within the turbine casing; and

a trigger device, responsive to the position signal, for triggering the image receptor to acquire an image when the airfoil is proximate the image receptor.

5. The system of claim 1, further comprising a controller actuating the positioner to move the image receptor from the first position to the second position.

6. The system of claim 1, further comprising an illumination source attached to the positioner for illuminating the airfoil.

7. The system of claim 6, wherein the illumination source is selected from the group consisting of an incandescent light, a fluorescent light, a xenon strobe, a light emitting diode, a laser diode, and a fiber optic light source.

8. The system of claim 6, wherein the illumination source is configured to emit electromagnetic energy comprising a desired wavelength.

9. The system of claim 6, wherein the desired wavelength comprises an infrared wavelength.

10. The system of claim 6, further comprising a wavelength filter disposed in a illumination path from the illumination source to the image receptor.

11. The system of claim 1, wherein the image receptor comprises an infrared detector capable of sensing electromagnetic energy comprising an infrared wavelength.

12. A method for imaging an airfoil within a combustion turbine engine comprising:

disposing an image receptor within an inner turbine casing of the engine at a first position;

acquiring a first image of the airfoil at the first position;

moving the image receptor to a second position within the inner turbine casing of the engine;

acquiring a second image at the second position; and

generating a composite image from the first and second images.

13. The method of claim 12, wherein the first and second positions are along respective lines of view perpendicular to an axis of the airfoil.

14. The method of claim 12, wherein the first and second positions are along respective lines of view perpendicular to a surface of the airfoil.

15. The method of claim 12, further comprising:

sensing respective radial positions of the image receptor when acquiring the first image and the second image; and

correlating respective sensed radial positions with the first image and the second image.

16. The method of claim 12, further comprising:

detecting an angular position of the airfoil relative to its axis of rotation; and

triggering the image receptor to acquire an image when the airfoil is proximate the image receptor based on the angular position.

17. The method of claim 12, further comprising:

detecting angular positions of the airfoil relative to its axis of rotation when acquiring the first image and the second image; and

correlating respective detected radial positions of the airfoil with the first image and the second image.

18. The method of claim 12, further comprising:

disposing an illumination source within an inner turbine casing the engine; and

illuminating the airfoil while acquiring an image.

19. The method of claim 18, further comprising illuminating the airfoil at an angle of less than about 30 degrees with respect to an axis of the airfoil.

20. The method of claim 18, further comprising filtering light reflected from the airfoil to receive a desired wavelength of the light at the image receptor.

21. The method of claim 20, wherein the wavelength of light is selected from the group consisting of a wavelength corresponding to red, blue, and green light.

22. The method of claim 12, further comprising:

acquiring a first version of the first image using a first wavelength of electromagnetic energy;

acquiring a second version of the first image using a second wavelength of electromagnetic energy different from the first wavelength; and

processing the first and second versions of the first image to extract image details.

23. The method of claim 22, wherein processing further comprises a subtractive process between the versions.

24. The method of claim 22, wherein processing further comprises an additive process between the versions.